KEVLAR/GLASS FIBER REINFORCED NYLON STRUCTURES PRINTED IN 3D WITH VARIOUS FIBER INTRODUCTIONS EXHIBIT MECHANICAL PROPERTIES UNDER DIFFERENT TEMPERATURES

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Poster 17

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INTRODUCTION

3D printing provides a new technical means for the preparation of functionally controlled continuous fibre-reinforced composites with variable fibre content. The constitutive model of 3D printed continuous fibre-reinforced composites (CFCs) with different fibre contents is the basis for establishing mechanical analysis models and design methods of functionally regulated composites based on 3D printing.

RESEARCH AIM

The purpose of this study is to analyse the effects of the fibre reinforcement level and its filaments' orientation. The Volume Averaging Stiffness model and finite element analysis (FEA) method of 3D printed composites were established by using the material properties of 3D printed composites with different fibre contents.

CONCLUSION

the structural performance of the 3D printed composite materials is directly dependent on the reinforcement structure of the fibres, and their orientation. Also, when the volume of the glass and Kevlar fibres is reduced, their axial modulus is reduced. The VAS method was used to calculate Poisson's ratio and elasticity. These values were seen to be similar to the experimental results.

RESULTS